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REMARKS

Claims 1-9, 11-24, and 32-39 are currently pending in the present application. Claims 1-9 and 11-24 have been allowed. Claims 32-39 stand rejected. Claims 32 and 39 are the only currently rejected independent claims.

Independent Claim 32

Independent claim 32 has been amended to clarify the nature in which O₂ and H₂ are generated in the hydrogen generation section recited in the claim. Specifically, claim 32 now clearly recites that the hydrogen generation section is configured to generate O₂ as a byproduct of hydrogen generation and separate the O₂ from H₂ generated therein. Further, the claim has been amended to clarify that H₂ is delivered to the NO_x treatment section separate from the O₂ generated in the hydrogen generation section and that the O₂ is delivered to the peripheral system separate from the generated H₂. In contrast, the system taught in the cited reference (US 6,716,398 - Caren) merely provides a hydroxyl generator that directs hydroxyl enriched air to the precombustion or postcombustion gas streams. The hydroxyl enriched air merely includes a mixture of hydroxyl, free radicals, and oxidizers H₂O, HO₂, and H₂O₂. Further, there is no suggestion in the Caren reference that a hydrogen generation section can be utilized to deliver H₂, separate from O₂, to the NO_x treatment section while delivering O₂, separate from H₂, to a peripheral system. Accordingly, applicants respectfully submit that the Caren reference cannot form the basis of an anticipatory rejection of claim 32.

Regarding dependent claims 33-38 applicants note that the peripheral systems recited therein correspond to specific systems that would receive the hydrogen-separated O₂ from the hydrogen generation section recited in claim 32. None of the peripheral systems present in the Caren reference are configured to receive O₂ generated in this manner.

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Independent Claim 39

Applicant's response of February 1, 2005 introduced independent claim 39 and directed the Examiner's attention to the fact that the cited references all relate to systems where water vapor is first condensed to liquid water and subsequently fed to the electrolyzer. In contrast, independent claim 39, as introduced in the prior response expressly recited that "water vapor containing exhaust" is directed to the hydrogen generation section. To further clarify this distinctions, claim 39 is amended herein to recite that the device is "free of a condensation unit which would otherwise enable delivery of water to said hydrogen generation section" and that the exhaust diverter is configured to direct water vapor containing exhaust to the hydrogen generation section "without substantial condensation of water vapor in said diverted exhaust."

As was noted in applicants response of February 1, 2005, The systems taught in the cited references electrolyze liquid water and produce a product containing a liquid water/oxygen 2-phase stream and a pure hydrogen product. The scheme recited in claim 39 relates to a system where moist engine exhaust is electrolyzed and used to produce an oxygen-enriched engine exhaust product and a pure hydrogen product. Applicants respectfully submit that the two types of schemes described above in relation to claim 39 differ significantly and, as such, the cited references cannot form the basis of an anticipatory rejection of claim 39.

Further, applicants respectfully submit that the systems taught in the cited references differ from that of the present invention to such an extent that the references would not appear to qualify as candidates to form the basis of an obviousness rejection of claim 39. For example, the Andrews patent, which does not direct water vapor to the electrolyzer, will have a problem operating continuously at steady-state, as once the engine warms up, it is likely to be quite difficult, if not impossible, to condense liquid water using engine coolant. The scheme described in the Andrews and Zagaja patents, where liquid water feeds the electrolyzer, necessitates that the gas must be cooled to below its dew point. In contrast, the scheme of the present invention enables continuous operation because there is no water reservoir to deal with. Further, the scheme of the present invention, where a water vapor containing exhaust is fed directly to the eletrolysis unit, permits the use of ambient air for cooling the diverted exhaust to above its dew

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point -a significantly easier proposition than the scheme taught in the cited references, as the ambient air is dozens of degrees cooler than engine coolant. Further, by directing water vapor directly to the electrolysis unit, the scheme of the present invention is not required to cool the diverted exhaust as far as is the case in the scheme of the cited references. Nor is there any need to get rid of the latent heat of condensation of the liquid water, as would be the case in the scheme of the cited references.

CONCLUSION

For the above reasons, the Applicants respectfully submit that the above claims represent allowable subject matter. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,
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